

Chair's Summary Report

2017 SWFSC Economics and Social Science Program Review

**Santa Cruz, CA
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Review Panel:

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Chair's report: 2017 Economics & Human Dimensions Science Program Review

NOAA Fisheries Southwest Fisheries Science Center

July 24-28, 2017, Santa Cruz, CA

Review Panel Members

- Dr. Lisa Colburn, NOAA Fisheries Northeast Fisheries Science Center
 - Anthropology
- Professor Ted McConnell, University of Maryland (retired)
 - Resource economics
- Professor Jeff Michael, University of the Pacific
 - Resource economics
- Dr. Samuel Pooley (chair), University of Hawaii affiliate & NOAA Fisheries (retired)
 - Social science (political science and economics)
- Dr. Olivier Thébaud, IFREMER: Institut français de recherche pour l'exploitation de la mer (French Research Institute for Exploitation of the Sea)
 - Resource economics

Background

Purpose of the Review and Terms of Reference:

This review of the SWFSC's economics and human dimensions program was part of NOAA Fisheries science program review initiative in which each science center is reviewed on a common topic annually conducted since 2014.¹

NOAA Fisheries Science Program Review

Sound science is critical for making the right decisions when it comes to managing our nation's fisheries and protected species. To maintain our world-class science, NOAA Fisheries continually strives to advance the science that informs fisheries and protected resources management. In January 2013, as part of our ongoing improvement efforts, we begin a systematic peer review process at all six of our regional science centers and our headquarters Office of Science and Technology. Experts from within and outside the agency will carefully examine our science programs on a 5-year peer review cycle to improve

¹ <http://www.st.nmfs.noaa.gov/science-program-review/>

integration, identify best practices, and share successes and challenges within our science enterprise. The review process will include opportunities for public involvement, which will be part of our broader dialog with fishery management councils, fishing industry, and other stakeholders.

The Terms of Reference for this year's review read in part²:

Reviews of science programs at the NMFS Regional Science Centers (including associated laboratories) and, when appropriate, the Office of Science & Technology (ST), are conducted to:

- Evaluate the quality, relevance, and performance of science and research conducted in NMFS Regional Science Centers (Centers) and associated laboratories
- Strategically position the Centers and ST in planning future science and research.

These reviews will assess the extent to which current science programs are focused on the priority information needs required to complete the NMFS mission, assess the quality and effectiveness of these programs, and make recommendations for the future.

The agency's economics and human dimensions review was organized around seven questions or themes:

1. Program goals and objectives
2. Integration with other programs
3. Socio-economic data collection
4. Models and research tools
5. Resource management application:
6. Best available science
7. Communication of results

The full text of these seven questions from the Terms of Reference is appended at the conclusion to this report.

Each of the five panel members completed independent review reports.

The purpose of the chair's report is to summarize the program review proceedings (e.g. what happened, salient issues, and recurring themes) in a report submitted to the Center/ST Director at the close of the review. The chair's report does not represent a consensus of panelists' observations and recommendations (this limitation is due to the Federal Advisory Committee Act (FACA) that places restrictions on consensus conclusions in such reviews).

The SWFSC leadership will have an opportunity to provide a response to the panel reports, and both

² The Terms of Reference and additional material on the NOAA Fisheries website at:
<http://www.st.nmfs.noaa.gov/science-program-review/>

the panel reports and the SWFSC response will be posted on the SWFSC and NOAA Fisheries websites later in the year. The NOAA Fisheries science leadership will also prepare a national response to this year's reviews in all six science centers (as well as the review of the Office of Science and Technology's economics and human dimensions program). The national response is expected to provide an overview of the economics and human dimensions reviews conducted in 2017, summarize the key issues from all seven reviews, and present a national-level response for those issues identified during three or more of the reviews. [See National Response to the FY 2015 Reviews of NOAA Fisheries' Protected Species Science Programs as an example on the NOAA Fisheries Office of Science and Technology website referenced above.]

SWFSC economics and human dimensions program organization

The SWFSC has two largely independent economics (and human dimensions) programs: one in the Fisheries Resources Division of the SWFSC La Jolla Laboratory and one in the Ecological Services Division of the SWFSC Santa Cruz laboratory.

Each program consists of three full-time Federal economists (5 Ph.D.'s and 1 Masters) as well as several related researchers through university connections. Neither program has a human dimensions specialist (which in common parlance refers to anthropologists, sociologists, geographers, or any of the other social sciences). The NOAA Fisheries West Coast Region (WCR) has one economist but that work was not included in this review.

Each program has an identified team lead, although the full-time position of team lead at the Santa Cruz program is empty, currently being filled on a rotating basis by existing staff within the Santa Cruz laboratory.

The two programs largely relate to separate components of the NOAA Fisheries mandate. For example, the La Jolla program focuses on economic analysis of coastal pelagics and highly migratory species while the Santa Cruz program focuses on groundfish and salmon, including watershed issues. The NOAA Fisheries Northwest Fisheries Science Center's economics and human dimensions program also covers aspects of the Santa Cruz program's field of interest (there were no participants from the NWFSC at this review).

Both programs refer their economic information and analysis to the NOAA Fisheries West Coast Region and to the Pacific Fisheries Management Council, as well as to other agencies (e.g., the U.S. Department of State for highly migratory species issues and the State of California for salmon and watershed issues).

Proceedings

The review took place July 25-27, 2017 at the University of California's Seymour Center adjacent to the NOAA Fisheries laboratory in Santa Cruz, California.

The first quarter of July 25th proceedings involved background presentations from SWFSC managers as well as from the Pacific Fisheries Management Council and the NOAA Fisheries West Coast

Region.

The remainder of the July 25th proceedings involved five presentations by La Jolla economics staff covering their organization and research on commercial and recreational fisheries.

The Santa Cruz economists made their presentations on July 26th (five presentations).

Each presentation was followed by an opportunity for questions from the panel as well as (limited) questions from the public and other staff who attended in person. (The presentations were streamed live over the Internet and the meeting materials were available from the SWFSC website. Members of the public who were observing the meeting in that manner did not have the opportunity to ask questions orally but they could submit questions by e-mail and on-line chat.) The public was also invited to ask questions and make comments at the conclusion to each day's proceedings.

The review panel met separately on July 27th in closed session and made oral reports to the Center and national leadership later in the day. This included the deputy director of the SWFSC, the two division chiefs that host the economics programs, and the director of the NOAA Fisheries Office of Science and Technology.

Draft written reports by each panel member were to be completed and submitted to the Center director on July 28th with final reports due August 4th. Some panelists focused on specific areas of the review based on their expertise. Each report was completed independently although the panel met three times (at the conclusion to the July 25 & 26 sessions and throughout the day on July 27th) to identify information needs and clarify information that had been presented. The panel members also shared their overarching observations and recommendations which are summarized in the chair's report.

On behalf of the panel, as chair I would like to express our appreciation to the SWFSC Santa Cruz laboratory for their hospitality during this review and for the excellent organization of the meeting, including provision of meeting materials, and the SWFSC economics staff from both La Jolla and Santa Cruz for the professionalism of their presentations and their responsiveness to questions from the panel. These program reviews are time-consuming and undoubtedly stressful to a certain extent. The SWFSC economists handled the job with grace.

I would also like to acknowledge the participation of the Pacific Fisheries Management Council's economist and the deputy director of the NOAA Fisheries West Coast Region, as well as the attendance by several representatives from other agencies, the fishing industry and conservation organizations, and the general public. This involvement is critical to the success of a conservation and management agency's research and information mandate and in making these reviews "real".

And finally, appreciation for making the proceedings available through live-streaming on the Center's website and making the materials available there as well.

Recurrent Themes

The following are some recurrent themes of panel members (again remembering that these do not

represent a consensus per FACA). Not all panel members might agree with these themes.

1. The SWFSC economists are highly energized and conduct interesting and in many cases cutting-edge research. They are articulate and were quite forthcoming and open in their presentations and response to questions from panel members (and the public).

Their research is high quality over a broad spectrum and extends beyond the typical boundaries of resource economics.

2. The SWFSC economics and human dimensions program is in reality two economics programs, since there are no human dimensions staff and minimal if any contracted human dimensions research or data collection. This absence was considered problematic to meeting agency mandates by several panel members. This absence also represents lost opportunities and may impoverish regulatory decision-making.
3. The two programs also act independently from each other, occasioned by both geography and topics but also through the lack of common topics and of a common forum for collaboration.

Major Observations and Recommendations

The following represent various observations and recommendations by panel members at the conclusion to the review. They are not in any particular order, do not represent a consensus and do not represent the views of the chair, per se. Not all panel members might agree with these observations and recommendations. The panelist's individual reports stand on their own: this overview is based on discussion amongst panel members.

1. Program goals and objectives:

- The two programs are stretched thin given the range of their mandates.
 - It is important to preserve time for each economist to conduct research and publication time and at the same time prioritize activities related to critical agency requirements.
- The economics and human dimensions program does not appear to be well-represented within SWFSC strategic planning.
 - Consideration should be given to an externally-facilitated strategic planning process for the SWFSC socio-economics program itself (as well as integration into the next SWFSC strategic planning exercise).
 - Program-level strategic planning should include at least one

representative from the Northwest Fisheries Science Center's economics and human dimensions staff, and in the absence of a human dimensions specialist at the SWFSC, an external participant with applied expertise in those disciplines. The strategic planning should also include representation from the NOAA Fisheries Office of Science and Technology.

- An aspect of a strategic planning exercise for the SWFSC economics and human dimensions program should be prioritization of positions to be filled (by discipline and location).
- Research and data collection activities and staffing should be explicitly related to specific high priority analytical needs from NOAA's regulatory offices including Magnuson-Stevens, protected species, and international highly migratory species topic areas.

2. Integration with other programs:

- The two programs (La Jolla and Santa Cruz) could collaborate to a greater extent, and there might be a rationale for integrating the two programs under single leadership although it is clear they are being quite successful independently in terms of the quality of each program's work.
- There seemed to be concern that there is too little integrated research involving multiple species, incidental catch, or ecosystem-based management (e.g., EBFM and IEAs). Integration into the agency's ecosystem working group might provide specific research questions that would enhance this kind of integration.
- Greater transparency in terms of external funding opportunities, particularly with the NOAA Fisheries Office of Science and Technology, would seem appropriate.
- While examples of collaboration with the Northwest Fisheries Science Center's economics and human dimensions staff were presented, it was not clear there was a well-defined process for coordinating such research.
- The two programs have excellent relationships with several universities that have borne fruit in terms of individual collaboration. Greater use of post-doctorate and other fellowships would be an excellent way to build capacity to fill gaps in the socio-economic disciplines available to the two programs.

- The two programs expressed high marks for their relationship with the NOAA Fisheries Office of Science and Technology (ST). At the same time, the SWFSC economics and human dimensions programs should “think bigger” in terms of appeals to requests for proposals (RFPs) and for assistance in filling the human dimensions gap.

3. Socio-economic data collection:

- The economists appear to spend a surprising amount of time of time managing data although they would have a key role in the design of data collection programs and thorough knowledge of the data management process. Several of the team have created innovative data consolidation tools that should be transferred at this stage to professional data managers with the SWFSC (and potentially PacFIN) for data submission and data management maintenance.
- A review of the SWFSC data management structure related to socio-economic research needs seems warranted.
- An external review of the key socio-economic data collections conducted by or in conjunction with the SWFSC appears warranted.

4. Models and research tools:

- Overall there was high confidence in the economics approaches taken by the two programs. Some of this research is highly original as represented by their publications record.
- Greater support for recreational and non-market economic valuation approaches would be useful, as would of course for human dimensions data collection and modeling.
- Support for data collection design and management could be enhanced (the research tools question).

5. Resource management application:

- The economists balance the demands for immediate inputs into the management

process with the peer-reviewed work admirably.

- The review highlighted the important research the Santa Cruz economists were providing on protected species issues (salmon and watershed issues). This work could be strengthened and work on marine mammal protected species issues could be considered by the La Jolla economists.

6. Best available science:

- The publications record of the two economics program indicates the staff's ability to generate high-level research. They clearly have the respect of their peers.
- Similarly, the expressed value of SWFSC economics research by agencies and stakeholders also indicates a strong sense of reliability.
- At the same time, a more structured peer review process for potentially high-policy impact research (e.g., grey literature directed toward regulatory agencies) appears warranted.

7. Communication of results:

- The two programs have an excellent publications record but have failed to embrace social media as a mechanism to bring their research results to the broader public.

Submitted: Samuel G. Pooley, review chair 8/4/2017

Appendix:

Overarching Questions for Reviewers

Science Center staff will provide information that describes their socioeconomic programs. The Office of Science and Technology will present information relevant to the program at a national level. The reviewers will use this information (and any ensuing discussion) to provide advice on the quality and relevance of the science program towards meeting management needs in the region. The reviewers should consider these overarching questions:

1. Program goals and objectives: Does the Center/ST have clear goals and objectives for an economic and sociocultural science program? Do the Center's/ST's Programs provide information to address the priority needs of the Regional Offices, other NOAA managers, Fishery Management Councils, Fisheries Management Commissions, and other stakeholders that require economic and human dimensions -related information to achieve their mission? Do the Center's/ST's Programs have a strategic research agenda that anticipates evolving and long-term economic and sociocultural science needs including research to support adapting to climate change and implementation of ecosystem-based fishery management?
2. Integration with other programs: Are the Center's economic and sociocultural programs appropriately integrated with each other and with other science activities within the Center? Are research efforts integrated, where relevant, with efforts at the regional offices and headquarters?
3. Socio-economic data collection: Is the status of data collection related to commercial fisheries, recreational fisheries, fishing participants, and communities adequate to fulfill economic and sociocultural science research needs? Has the Center/ST developed strategies to obtain, manage, and make data accessible? Are there barriers that impede data collection and access to data held by other entities (e.g. states, commissions, other federal agencies, etc.) that could be used to support the Center/ST's research, and how can these barriers be overcome?
4. Models and research tools: Are the Centers/ST using appropriate models and research tools to analyze data and provide management advice? Are they developing and using methods and models that contribute to the evaluation and exploration of ecosystem based fisheries management and other emerging issues? Are there barriers to adapting to address emerging issues?
5. Resource management application: Is the Center's/ST's social and economic information being used in living marine resource management advice? Are the existing mechanisms sufficient for ensuring this information is used appropriately? Are there barriers to the uptake of

science provided by the Center and what steps can be taken to overcome these?

6. Best available science: Is the Center providing the Best Available Science? Are the Center/ST's economic and sociocultural research products adequately peer-reviewed? Are the appropriate processes being used to ensure that scientific products meet professional standards and are of high caliber?
7. Communication of results: Does the Center's/ST's program use the best tools to appropriately communicate research results to various managers, partners, stakeholders and the public?

In all cases, the reviewers should note areas where the Center's Economics and Human Dimensions Science Program is doing well and provide recommendations for areas that need improvement.

Appendix 2

Panelists' Reports 2017 SWFSC Economics and Social Science Program Review

**Santa Cruz, CA
July 2017**

Panelist report #1 (July 28, 2017)

NOAA Fisheries Southwest Fisheries Science Center: 2017 Economics & Human Dimensions Science Program Review (July 24-28, 2017, Santa Cruz, CA)

Introductory comments

I would like to thank NOAA Fisheries for inviting me to participate in this panel. This has given me a great opportunity to better understand the research carried out by the staff of the Economics and Human Science Program of the Southwest Fisheries Science Center (SWFSC). Thank you also to the Santa Cruz lab for their hospitality during the review. This report is intended to provide constructive feedback based on the background documentation and the presentations and discussions during the review. In the following, I will use the term “Human Dimensions” as an over-arching category for the research considered here, which includes economics and other social sciences.

Observations and recommendations to overarching questions

8. Program goals and objectives:

- a. *Does the Center/ST have **clear goals and objectives** for an economic and sociocultural science program?*
- b. *Do the Center's/ST's Programs provide information to **address the priority needs** of the Regional Offices, other NOAA managers, Fishery Management Councils, Fisheries Management Commissions, and other stakeholders that require economic and human dimensions -related information to achieve their mission?*
- c. *Do the Center's/ST's Programs have a **strategic research agenda** that anticipates evolving and long-term economic and sociocultural science needs including research to support adapting to climate change and implementation of ecosystem-based fishery management?*

Strengths

The program develops high quality research on a broad spectrum of economic and social questions that seem highly relevant to the needs of the managers and stakeholders in the region, as well as nationally and internationally. This includes research on:

- evaluation and management of domestic and international commercial fisheries for highly migratory species (HMS), particularly tuna, as well as groundfish and salmon fisheries;
- evaluation and management of recreational fisheries;
- management of bycatch and interactions with protected species;
- economic evaluation of alternative fisheries management approaches, including rights-based systems;
- markets for sustainable / locally caught seafood;
- interactions between the management of aquatic habitats and salmon conservation;
- ocean recreation.

The research also expands to issues beyond the jurisdictional boundaries corresponding to the direct mandates of the SWFSC, but which seem highly relevant from an ecosystem-based management perspective, such as water management by the Santa Cruz team, and deep sea resource use management by the La Jolla team.

Some of these lines of research are original / niche areas in which the Center seems in a particularly strong position, given its mandates, access to data, expertise as a group and networks

(both research and stakeholder), to develop programs with strong relevance and impact. In particular, the following two interdisciplinary streams of research offer promising perspectives for future development:

- Integrated assessment of water management, aquatic habitats and commercial and recreational fisheries for salmon, working towards the development of integrated Water/Fisheries Management Strategy Evaluations (MSE);
- International fisheries governance (including bycatch and protected species considerations) and extensions to the governance of high seas / deep sea resource management (including seabed mining).

Two additional key areas with strong human dimensions and/or important future perspectives include:

- Markets for sustainable seafood, and trade leakage issues in global seafood markets;
- Rights-based management research including applications to highly migratory species, analysis of community-quota development in catch share systems and the comparison of resource allocation regimes across water and fisheries systems.

In addition to research, staff are also strongly involved in data collection, management and routine analysis, as well as in various advisory roles in relation to management.

Challenges

- There is a gap in social science research which can only be very partially addressed by the team in the absence of a social scientist.
- Some of the key needs identified are not addressed, including research and advice on coastal pelagic species fisheries and aquaculture. In addition, participation in integrated ecosystem assessment processes and the MSE approach under development at the national level seems limited (although this appears on both FRD and FED team's plans for future work). This seems largely due to staffing issues, with two vacant positions, one in each team.
- Staff seem to be stretched thinly across their different tasks (basic research, data collection management and analysis, advisory roles, outreach, etc.).

Recommendations:

- There appears to be a need to (i) clarify the areas of research and advice regarding social issues that can be covered by existing staff, e.g. using economic indicators (employment, wages, distributional effects, ...), and the areas which require dedicated involvement of one or more social scientists, and (ii) recruit staff to work on these latter areas. This will likely require expert advice from social science researchers.
- Given the scope of the topics that need to be addressed, and the limited resources available, a research prioritization exercise would likely be useful to determine future areas of work, particularly in relation to new positions that would be made available to fill those that have become vacant. Such prioritization could be carried out collectively by the La Jolla and the Santa Cruz teams, with the two Divisions and Center leaderships, as well as the Office of Science and Technology (S&T), as the Office seems to provide a significant part of the resources supporting the program.
- It seems key that the vacant positions be filled. Definition of the profiles for these, and

possibly other positions that may become available, could be determined based on the different needs identified in the prioritization process in terms of strategic areas of research, data collection and management, team leadership, and expert roles in management advice.

- Both teams, in collaboration with the Divisions and Center, could also explore possible ways to develop collaborations with temporary research staff (invited temporary positions, sabbaticals, hosting of post-doctoral researchers, etc.), on specific topics of interest.

9. Integration with other programs:

- a. Are the Center's economic and sociocultural programs **appropriately integrated with each other and with other science activities within the Center?***
- b. Are research efforts **integrated, where relevant, with efforts at the regional offices and headquarters?***

Strengths

The two teams have developed collaborations:

- with scientists from the Center working in other disciplines (ecology, biology, hydrology, etc.) in connection with their research projects as seemed necessary;
- with economists and other social scientists in other Centers (particularly the North-West and North-East Fisheries Science Centers) as well as with S&T in relation to data collection and research projects;
- with data collection networks relevant to the program's research (in particular PacFIN and RecFIN).

Challenges

- There seem to be limited interactions between the two teams at either research planning or implementation stages.
- Interactions with other scientists in the Center seem to develop largely on an ad-hoc, project basis.

Recommendations

- I feel that the program, the Divisions and the Center would benefit from a more regular / formal process of interaction between the two teams (Santa Cruz and La Jolla), particularly as it comes to prioritizing areas and methods of research / data collection / management, as well as involvement in other duties relating to management advice, or divisional, Center and national level working groups.
- Possible avenues for strengthened collaboration between the two teams could be explored, such as:
 - Linking work on recreational fisheries by the FRD team and work on commercial fisheries by the FED team to develop an integrated assessment capacity, possibly also linking with NWFSC research on the same fisheries (groundfish, salmon);
 - Mutualizing data management and routine analyses and sharing expertise and resources in the development and management of surveys and in the analysis of survey results;

- Linking the research undertaken by both teams on seafood markets and trade analysis.
- A more formal process of interdisciplinary collaboration on the development of integrated Ecosystem-Based Management (EBM) approaches could favor more regular interaction with other parts of the Center. This could be through participation in the Ecosystem Approach Group that I understand has been established by the Center, and identification of applied research questions that could contribute to the California current socio-ecosystem program, although this raises the question of trade-offs / priorities in the use of available staff time (see points 1 & 6).
- There may be value in developing a consolidated view of key research streams that the SWFSC economics and social science program addresses and that are also being addressed in other Centers at the national level, such as rights-based management research or research on markets and demand for seafood. This could be an interesting outcome of the national review process once it is completed.
- With respect to social dimensions, in addition to reinforcing the program with at least one social scientist, it seems important to strengthen the links with other Centers and external collaborators working in this domain.

10. **Socio-economic data collection:**

- a. *Is the status of data collection related to commercial fisheries, recreational fisheries, fishing participants, and communities **adequate to fulfill economic and sociocultural science research needs**?*
- b. *Has the Center/ST developed **strategies to obtain, manage, and make data accessible**?*
- c. *Are there **barriers that impede data collection and access to data held by other entities** (e.g. states, commissions, other federal agencies, etc.) that could be used to support the Center/ST's research, and how can these barriers be overcome?*

Strengths

The teams use a wide range of data from multiple sources operated outside the Center. Regarding fisheries, I understand that the teams have access to recurrent information on commercial fishing effort, landings and gross returns and some cost information produced via intermittent surveys, as well as economic information on recreational fishing.

Researchers from both La Jolla and Santa Cruz teams contribute to:

- The social and economic data collection and synthesis process at the national level for commercial and recreational fisheries, as well as other topics (catch shares, ocean recreation, ...);
- The development of data management and access tools, notably via collaborations with Pacfin and Recfin;
- The design and management of specific surveys to collect information in relation to particular projects (markets, recreational fishing, fishing communities, etc.).

Challenges

- Cost data for commercial fisheries is collected on an intermittent basis, and is not available in some cases (highly migratory species fisheries), which is likely to limit the ability to assess profitability / efficiency indicators.
- The nature of social information available to address community socio-cultural dimensions is unclear to me, which is probably related to the absence of a social scientist in the program.
- Many of the data collected (e.g. on the sustainable seafood question) and indicators (e.g. on the port concentration of activities) defined as part of locally run projects seem highly relevant and of potential interest to a broader set of users, but it is not clear how they could be incorporated in regional or national data systems.
- The resources supporting data collection, management and access seem very limited, leading the researchers to spend significant amounts of their time in survey design and management, data handling, etc.

Recommendations

- Increased support for social and economic data collection, management and access for the two teams seems warranted, in connection with existing data-support infrastructure in the Center and at the regional and national levels. Such support could also help consolidate data from specific projects into broader / longer-term monitoring systems.
- Support could also include the production of routine or ad hoc indicators and summaries based on the data, after products have been stabilized in collaboration with researchers, as such repetitive work is not the best use of research time.
- Collaborations could be sought with other groups developing standard routines to analyze the data available/collected at a broader national scale (eg VMS data). Involvement in data collection exercises could also be prioritized and discussed across the two teams, taking into account possible external collaborations and existing data sources.
- Research carried out by the program would benefit from an increase in the efforts devoted to the collection of economic information on both commercial and recreational fisheries, at the national and / or regional level.

11. Models and research tools:

- Are the Centers/ST using **appropriate models and research tools** to analyze data and provide management advice?*
- Are they developing and using **methods and models that contribute to the evaluation and exploration of ecosystem based fisheries management** and other emerging issues?*
- Are there **barriers to adapting** to address emerging issues?*

Strengths:

- The methods and research tools used by both teams seem appropriate, and are often cutting edge science, as attested by publications on novel approaches in top ranking

journals in economics and other disciplines.

- The researchers also entertain strong links with the University of California in both locations (Santa Cruz and San Diego), which provides for interaction with academic researchers working in the various fields of research relating to the program and opportunities to discuss methodological questions.
- Although staff presentations mentioned limitations in addressing EBM research, I believe that some of the work presented directly addresses EBM and does so in a very operational and convincing way, as well as relying on the latest techniques to do so. Two notable examples are the management of interactions with protected species and bycatch management in HMS fisheries, and the integrated analysis of water-habitat-salmon fisheries interactions. The development of a data set on ocean recreation and of data systems linking fisheries and demographic data also contribute to the development of EBM.

Challenges and recommendations:

- Although some innovative approaches (e.g. using methods from economic geography, or integrating demographic data with fisheries data to enable integrated assessments at the community level) are convincingly used to address the social impacts of management or of environmental changes, I feel that fully evaluating the socio-cultural dimensions of these changes will only be possible with the recruitment of specialized staff.
- The research and results presented by the two teams also point to an important set of questions relating to governance and integrated management across multiple jurisdictions. This seems an area in which collaborations could be further strengthened with external specialists in law and political science.
- To date, it appears that the program has not addressed ecological-economic modeling and integration of social and economic dimensions into MSE approaches. Given the national objective of developing such integration, it would seem important to explore ways in which both teams can contribute to this, in connection with modeling experts in other Centers / groups. This could start by the incorporation of relatively simple economic components (eg price flexibilities; CPUE or VPUE driven levels and allocation of fishing effort) in existing MSE-related biological modeling approaches. There would be value here in developing collaborations with bio-economic modeling experts in NOAA (e.g. through workshops or the joint supervision of post-doctoral research projects). Recent reviews of available models internationally may also be useful in this respect³.
- Given that the two teams have complementary sets of skills, interaction on methods-related questions (e.g. in designing surveys or econometric modeling) could also be beneficial.
- Publication of the methodological research that both teams carry out in support of their projects should be encouraged, where this produces innovative approaches that are worth sharing with the international research community.

³ See e.g. <http://onlinelibrary.wiley.com/doi/10.1111/faf.12232/full>

12. Resource management application:

- a. *Is the Center's/ST's social and economic information being used in living marine resource management advice?*
- b. *Are the existing mechanisms sufficient for ensuring this information is used appropriately?*
- c. *Are there **barriers to the uptake of science** provided by the Center and what steps can be taken to overcome these?*

Strengths:

- Research results are used in advice in multiple management settings, as well as by a range of stakeholders.
- Communication of the research to stakeholders relies on the formal processes associated with participation of the members of both teams in management / advisory bodies. Some of this also seems to be based on close interactions between staff members, management decision-makers and stakeholders.

Challenges and recommendations:

- Some results are quite innovative and with important practical implications, so may need dedicated efforts to convey their implications for management. For example, results regarding the re-estimations of Bmey when accounting for technological change and knowledge externalities seem of high relevance to the question of achieving optimal yield.
- Science uptake could be increased with the identification of staff that can operate at the interface of data analysis and research, policy and industry. I understand this can be one of the roles of an economist or social scientist with the West Coast Regional Office.
- Some of the EBM-relevant research is carried out at the interface of multiple jurisdictions. It seems important to identify the context for this research, taking into account the different, overlaying jurisdictions, as well as a strategy to position the work carried out in the program within this context, in terms of funding, collaborations within and outside NOAA, and communication and outreach.

13. Best available science:

- a. *Is the Center providing the **Best Available Science**?*
- b. *Are the Center/ST's economic and sociocultural research products **adequately peer-reviewed**?*
- c. *Are the **appropriate processes being used to ensure that scientific products meet professional standards and are of high caliber**?*

Strengths:

- Overall, the program has a strong publication record in the diverse research domains addressed by both teams.
- Internal peer-review processes are in place for the different types of documents that are produced based on the research and data collection and analysis work. In addition, team members publish in peer-reviewed journals of high standards.

Challenges:

- A key question here seems to be the time which is available to members of staff for basic research, both to carry out the research and to publish, especially given the breadth of tasks and research domains that the teams address (see prioritization discussion under point 1). According to the information provided during the review, this varies between 20-25% and 35%, which seems low to me.

Recommendations:

- It seems important that time for basic research be acknowledged as a key component in prioritizing the engagements of staff at the individual, team, division and Center levels, as the quality of the research will be fundamental to its relevance in decision support, and to the recognition of the Center's contributions on the human dimensions of marine resources management.
- Given the breadth of the regulatory mandates, and the limited pool of staff that can address requests from management and stakeholders, it also seems important to develop or reinforce existing internal processes to prioritize and allocate time devoted to responding to these requests.

14. Communication of results:

- a. *Does the Center's/ST's program use the best tools to appropriately communicate research results to various managers, partners, stakeholders and the public?*

Strengths:

The team invests in communicating science results to managers and stakeholders. This is important as it plays a key role in the trust for the science produced. Engaging stakeholders with regards to human dimensions research may also help gain greater support towards the science led by the Center more generally, and help identify priority questions that warrant further research efforts on economic and social issues.

Challenges and recommendations

Communication of the research results from the program could be strengthened. Raising the profile of this work is likely to increase the support towards collaborations and funding of the program's research, both internally and with external partner institutions. Means to achieve this could involve the following.

- In addition to the efforts from staff in both teams, research uptake by management and stakeholders would likely be enhanced with additional support from human dimension staff at the regional office (see also point 5).
- The Center has 0,75% ETP devoted to communication of science results to the broader public which seems low. I believe the teams would benefit from greater support at the Divisional and/or Center levels, in particular to help researchers identify the channels by which they can better communicate the results of their research.
- A more integrated presentation of the research streams at the Center level would likely also be beneficial to the visibility and outreach of the program.

Panelist report #2 (July 26, 2017)

NOAA Fisheries Southwest Fisheries Science Center: 2017 Economics & Human Dimensions Science Program Review (July 24-28, 2017, Santa Cruz, CA)

The following comments and observations reflect two days of listening and talking with economists and others from the SWFSC, as well as conversations with panel members and the economists themselves.

The group of economists working in the SWFSC is comprised of productive, responsible professionals. They are doing first-class research which is both relevant and often on the leading edge of research in their areas. They balance the demands for immediate inputs into the management process with the peer-reviewed work admirably.

The review was well organized and proceeded smoothly. The presentations were clear and represented well the work going as well as the immediate outlook for their research.

The economists in the Fishery Resource Division (FRD) in La Jolla and the Fishery Ecology Division (FED) in Santa Cruz appear to operate independently. Because they gave separate presentations and are working on different resources, I have often found it easier to address their work separately.

Observations and recommendations to overarching questions

8. Program goals and objectives:

FRD: The longer view of this group shows economists working on problems related to the fisheries of most importance to the La Jolla office—highly migratory species and coastal pelagic species (CPS). There does not seem to be great urgency in the management of the coastal pelagic species (CPS). As far as I could tell, they fulfilled needs under the Magnuson-Stevens, protected species and competition for habitat. However, they lack a economist-member of the CPS management team. Based on presentations from the Pacific council and the Regional office, there didn't seem to be glaring omissions in their coverage of issues.

FRD economics lacks work on the broad problem of multiple species-ecosystem wide fisheries management. There are several NMFS initiatives in this regard that need economics (ecosystem based management, ocean system management, etc.). While they might gain from ecosystem-wide research, there is a danger in this research when it lacks specificity. It needs to be problem-driven.

FRD lacks an individual in the area of social anthropology. It's not clear that there are now specific issues that require this type of research, but the absence is apparent.

As for objectives, the presentation from the economists provided a short run look at what the group will be doing but not a longer run vision. They would gain from a long run plan. .

FED: economists have documented their work in relation to Magnuson-Stevens and species-protection mandates.. Despite lacking a team leader, their research has taken on the classic problem of salmon protection and production and competing uses for salmon habitat. To the best of my ability to understand what they are doing, they are achieving their program goals.

Despite the absence of a team leader, their research has an organic feel to it. They have taken on research that is relevant to the fisheries and leads to research publishable in good journals. Along with FRD economists, they don't have marine ecosystem research ongoing. But the research on salmon and land use is really good ecosystem research.

Like FRD, FED also lacks a professional in the area of social anthropology. They seem to have greater need for this resource too. They are dealing with impacts from fishery management (community-owned quotas) and water use (changes in employment).

I doubt that it's luck that that they arranged their research to fit their mission. But they would be well served to have a team leader and a long run plan about what they will doing.

9. Integration with other programs:

FED and FRD. There was considerable discussion about the independence of the two groups of economists in FRD and FED. This should not be regarded as a failure. The economists in each group have effective relationships with biologists and ecologists and economists outside of SWFSC. Their research reflects good judgment on choice of research partners. They also seem to work with other divisions of NOAA when the need arises. That is, the Council seemed to have no specific need for their skills that went unfulfilled.

One area of overlap between FRD and FED is non-market valuation. There may be opportunity for collaboration here, and perhaps it's going on and I missed it. With the increasing likelihood of allocation between commercial and recreational fishing, nonmarket valuation will become more useful. There is some contact between FED and the Northwest Fisheries Science Center but there are more opportunities here.

The growth of community-owned or group-owned fishing rights in CPS requires some good economic analysis so far lacking in the SWFSC and currently expanding in the NWFSC.

FRD economists are well connected with UCSD, based partly on proximity and longevity, but these contacts took work, especially from Dale Squires. A similar set of contacts with UCSC seems less likely, given the absence of complementary work at UCSC. They have pursued university

collaborators elsewhere, and these have worked well.

10. Socio-economic data collection:

Researchers in both groups are actively pursuing data when and where they are essential. Economics is an empirical science and these people are all good economists.

I wonder whether the economists are doing too much data work. That is, are they managing and maintaining datasets beyond the point of planning survey? I can't tell whether the work with the PACFIN data is doing what is essential for their research or just maintaining the datasets. In the longer run, support for data management should be a priority.

11. Models and research tools:

Based on their journal placements and my own reading, I conclude the economists are using state of the art tools. They are typically using appropriate conceptual and empirical models. Some are more advanced than others. The work on choice experiment modeling in recreation in both offices might benefit with interaction with researchers from the NWFSC and academic economists. And survey development experts. Likewise, community quota ownership needs conceptual models of group formation. There is an opportunity for collaboration with economists at the NWFSC who are working on the formation and functioning of voluntary fishing groups.

12. Resource management application:

Much of the research applies directly to management issues. The boot strapping piece by Steve Stohs is an excellent example. His work on time and area closures in the coastal pelagic fishery is directly supporting management. Aaron Mamuma has examined the impact of a catch shares program on vessel productivity.

It is worth remembering that research should also be addressing long run understanding of fisheries. For example, the paper by Dale Squires "Technical Change and the Commons" is a valuable piece on how to think of the fisheries in the longer run.

13. Best available science:

Both groups of economists are by and large using the best available science. This is partly discernible from the people outside their group that they work with: ecologists, biologists and economists. They seem to have developed joint work with capable collaborators. From the research itself, the tools that they use can be characterized as 'best available science'. The journal quality of their papers is typically

quite good, also evidence in support of the notion of best available science.

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14. Communication of results:

The research that goes into journals is serving its professional purpose. Presentations to Council committees and stakeholders gets the applied research where it should be. What I don't see is research getting to the public, but I'm not sure it should be a priority, given their direct outlet to the policy process. In a sense, these researchers are in an ideal situation. There is a ready-made audience for the users of their research. They are imbedded in the policy process.

Panelist Report #3**Reviewer Report on Program Review of Economics and Human Dimensions Program**

Reviewer # ____

Southwest Fisheries Science Center**National Marine Fisheries Service****Santa Cruz, CA****July 25 to 28, 2017****INTRODUCTORY COMMENTS:**

The Economics and Human Dimensions Program of the Southwest Fisheries Science Center (SWFSC) is comprised of 6 FTE social scientists with training in economics and one full-time contractor. The staff are divided between the Fisheries Resource Division located in La Jolla, CA and the Fisheries Ecology Division located in Santa Cruz, CA with three staff in each location. Presently there are no FTE staff with training and expertise in social science methods other than economics.

The six economists that currently comprise the Economics and Human Dimensions Program team are clearly dedicated and committed to producing quality science. Overall, in spite of the appearing to be stretched thin, the staff appear highly productive as evidenced by an impressive array of publications and reports including peer reviewed journals and books. They also engage with a variety of stakeholders (council, regional office, industry etc.) providing timely and relevant information to address a range of management and other information needs.

FINDINGS AND RECOMMENDATIONS:**TOR THEME 1. PROGRAM GOALS AND OBJECTIVES**

- 1. Observations:** During the review process a variety of different references were used inconsistently to describe the type of research conducted by Economics and Human Dimensions Program staff at the SWFSC. This was pervasive across presentations and extended to the SWFSC strategic plan. These references included: socio-cultural/sociocultural, economics vs. non-economic social science, socio-economics/socioeconomics, human dimensions (sometimes including only sociocultural and sometimes including both economics and sociocultural). This lack of consistency across the various presentations and the strategic plan indicates a need for programmatic and center-wide clarity.

Recommendations to address issue: Effort needs to be directed to gaining a solid grasp of these disciplines and concepts as they are used within NOAA Fisheries and in relation to their importance to accomplishing NOAA's mission of Ecosystem Based

Fisheries Management (EBFM). The SWFSC 5 year strategic plan (dated July 2, 2013) is in its fourth year so will be updated soon. This reviewer strongly recommends that staff from the Economics and Human Dimensions Program be involved in the process.

2. **Observations:** The SWFSC 2013 strategic plan states that one of its strengths is analysis of both economic and sociocultural parameters in order to advise management and for management strategy evaluations. However, they do not currently have staff with training and expertise in sociocultural methods. It appears that economists are utilized to fill this gap.

Recommendations to address issue: Consideration should be given to hiring a minimum of one FTE with training and expertise in sociocultural methods. Consideration should also be given to the benefit of broadening the qualifications of the Santa Cruz team lead position to attract applicants from a broad array of social science backgrounds to include, for example, economics, sociology, anthropology, or human geography. A social scientist with a background in both quantitative and qualitative methods could be beneficial.

3. **Observations:** The SWFSC Economics and Human Dimensions Program provides high quality research products. However, there does not appear to be a long-term programmatic strategic plan to guide research priorities. In practice, staff research programs appear to be largely determined by staff either individually or collaboratively in anticipation of management or other needs. The direction of research programs is to some extent dependent on funds from the annual S&T RFP. Due to the competitive nature of this RFP, funding is uncertain from year-to-year, making planning for multi-year projects difficult. This uncertainty/dependence on soft funds can inhibit the development of long-term overarching research goals.

Recommendations to address issue: The Economics and Human Dimensions Program staff would benefit from the development of a programmatic strategic plan to prioritize their research goals and guide long-term planning. They should continue to make a concerted effort to seek research support from a variety of sources beyond S&T funds.

TOR THEME 2. INTEGRATION WITHIN THE PROGRAM AND ACROSS THE CENTER

1. **Observations:** While the Economics and Human Dimensions Program staff appear to be integrated within their separate divisions, there appears to be little collaboration between the economists at the two labs. This was emphasized by the organization of the review which compartmentalized the two divisions rather than synthesizing the overarching program. This compartmentalization suggests that there is limited synergy between the two divisions. However, some social science staff appear to be engaged in interdisciplinary work with scientists across the center.

Recommendations to address issue: The Economics and Human Dimensions Program economists would benefit from undergoing a programmatic strategic planning process. This would benefit both long term planning as well as enhance the value and profile of the program within the center. Further, an intentional, rather than ad hoc, center-wide effort to encourage collaborations between social scientists and natural scientists will add value to center products and insure research is on the cutting edge of EBFM.

TOR THEME 3. DATA ADEQUACY/MANAGEMENT AND ACCESSIBILITY

1. **Observations:** Due to the center-wide attrition of data management staff some economists appear to be heavily engaged in the management of data which, given other demands, may not be an appropriate use of their time and skills.

Recommendations to address issue: Consideration should be given to hiring additional data management staff.

TOR THEME 4. APPROPRIATENESS OF MODELS/TOOLS FOR EBFM AND OTHER/ BARRIERS

1. **Observations:** While some staff are engaged in research that addresses aspects of EBFM and have contributed to ecosystem assessments and climate change assessments, there were no economics staff at the SWFSC that participated in the collaborative development of the California Current Integrated Ecosystem Assessment conceptual model. While recognizing the demands on staff time, their absence was a lost opportunity to influence the outcome of a high profile product.

Recommendations to address issue: The SWFSC needs a balanced social science team in order to address EBFM, climate change and other emerging issues. There are an increasing number of emerging models and tools that could be useful to the SWFSC but staff need to engage with development and application of the models to regional data.

TOR THEME 5. USED IN MANAGEMENT APPROPRIATELY/BARRIERS/STEPS TO OVERCOME

1. **Observations:** While the economics staff provide relevant results and products to address management and other information needs, the lack of significant social science expertise at the WCRO and Pacific Fisheries Management Council may constrain the overall uptake of social science information produced by SWFSC staff.

Recommendations to address issue: Both the WCRO and PFMC could consider adding staff with social sciences expertise as is found in other regions.

TOR THEME 6. BEST AVAILABLE SCIENCE/PEER REVIEW/ PROCESSES TO ENSURE QUALITY

1. **Observations:** The economics staff appear to provide high quality research products as evidenced by an impressive array of publications and reports including peer reviewed journals and books. These products are rooted in economic analysis with sociocultural analysis notably absent due to a lack of staff with training and expertise in this area.

Recommendations to address issue: Broadening the expertise of the team to include staff with training in other social science disciplines will strengthen the team's ability to produce more integrated products that address mandated analysis.

2. **Observations:** The SWFSC has an internal manuscript review process similar to that found in other NOAA science centers, however it is not clear how rigorous it is. It appears that the social science staff sometime peer review work of other Center social science staff. This is a concern for manuscripts such as technical memoranda and other gray literature or reports that are not destined for submission to peer reviewed outlets.

Recommendations to address issue: An effort should be made to seek external reviewers. Care should be taken to ensure that all reviews are rigorous and objective.

TOR THEME 7. COMMUNICATION OF RESULTS

1. **Observations:** The team as a whole is highly productive, producing results that are of value to a broader range of audiences both internally within NOAA and externally. Dissemination of information/products appears to be primarily limited to in-person interactions, word of mouth and various types of written products including tech memos and peer reviewed journals and books. The use of social media for dissemination of results and products appears limited even though both the WCRO and SWFSC have Facebook and Twitter on their websites. This appears to be due, in

part, to limited staff (approximately one FTE at the SWFSC) that handles communications on a part-time basis and that communication of results for SWFSC is largely handled distally by the WCRO.

Recommendations to address issue: Consideration should be given to systematically increasing the profile of the social science program results/products both within NOAA and externally. This could be done through increased coordinated with the regional office. As discussed earlier, development of a social science program strategic plan would clarify the value of the contribution of their work in addressing NOAA's EBFM goals. Identification of a social scientist "spokesperson" within the center may also facilitate this process.

2. **Observations:** Information about the program is easily accessible from a tab on the SWFSC website homepage. The program information is organized into 3 categories (coastal pelagic fishes, highly migratory fishes and marine turtles; California salmonids and groundfish; recreational fisheries). These categories link to two pages organized by division (La Jolla and Santa Cruz) rather than specific information related to the three categories. The division pages have been updated this year but the Socio-Economics page has not been updated for several years. Also, although there are staff working on recreational fisheries in both locations, the website only highlights the work in lone location.

Recommendations to address issue: Consideration should be given revising the introduction page to explicitly link to divisions with information about staff and programmatic focus as well as informational pages about each program area. This would allow visitors to navigate more directly to program content of interest.

Panelist Report #4**Reviewer Report on Program Review of Economics and Human Dimensions Program**

**Southwest Fisheries Science Center
July 24-28, 2017 Santa Cruz, California**

General Observations and Recommendations

Overall, I am impressed with the quality and quantity of research generated by these small teams of researchers. Despite this productivity, the scope of important needs for economic and human dimensions research and engagement within the Southwest region is large and some needs are unfulfilled. Thus, it is important that key vacancies are effectively filled and activities prioritized.

Finally, I would like to comment that the review visit was well-coordinated, and all presenters and participants were very engaged and responsive to questions. I learned much from my participation, and am grateful for the opportunity. The list below highlights five key observations and recommendations.

1. High-quality Economic Research

- The Center economists are publishing economic research in high-level peer-reviewed journals, maintain up-to-date research skills, strong academic linkages, and are highly-respected in their fields.
- Overall productivity is high given the small total staff.

2. Staffing and Leadership

- Current level of staffing and composition does not reflect NMFS norms. The Center has a disproportionate number of vacancies, and the share of economists among existing staff is high.
- There are no social scientists in the Southwest regional office. This could harm development and communication of priorities at the regional level, and reduce the uptake of research to support management.
- The Santa Cruz team has functioned admirably well without a team leader for an extended period, but there is a critical need to address this vacancy to ensure adequate support, prioritization and communication.

3. Opportunities for Stronger Integration and Collaboration Between La Jolla and Santa Cruz

- This does not require combining the teams, but the small staff in each Center (as well as the lack of non-economic staff) leads to inevitable gaps in skills and experiences. Ecosystem management and human dimensions projects could create opportunities for more integration and collaboration.

4. Protected Species and Freshwater Habitat Issues

- This is a crisis policy issue and high priority for NMFS in the southwest region. While there has been some creative and effective work in this area by

the Santa Cruz team, the need for more economic and social science research around California water management is large. The focus area is ripe for additional investment in economic and human dimensions research to provide much needed support to management and policy makers as they attempt to meet species protection responsibilities in a highly-charged political environment.

- Because the topic does not fit within traditional NMFS fishery management structure, there is a risk that traditional processes for setting priorities may not optimally support this priority area.

5. Communication

- Excellent record of publishing in journals and traditional professional outlets, and developing formal and informal relationships with stakeholders.
- More could be done with social media and other communications platforms to communicate the value of the work with a broader group of stakeholders in a world where people (including Ph.D. researchers) are getting information in new ways.
- However, it is important to be careful that this does not increase demands on research staff. It was noted that communication staff were at the region level in the southwest, and these efforts could be better supported if the resources to support communication were closer to the research teams.

Specific Comments on the Overarching Questions for Reviewers

- 1. Does the Center/ST have clear goals and objectives for an economic and sociocultural science program? Do the Center's/ST's Programs provide information to address the priority needs of the Regional Offices, other NOAA managers, Fishery Management Councils, Fisheries Management Commissions, and other stakeholders that require economic and human dimensions -related information to achieve their mission? Do the Center's/ST's Programs have a strategic research agenda that anticipates evolving and long-term economic and sociocultural science needs including research to support adapting to climate change and implementation of ecosystem-based fishery management?**

The Centers appear to be responsive to their mandates and the needs of managers, Councils, Commissions and other stakeholders. Long-term strategic research agendas are an area that needs improvement and strategic planning efforts could be valuable at the Center level. Leadership vacancies and the lack of social scientists at the level of regional management could be a barrier to these efforts in the near term.

The need for more ecosystem-based fishery management and integration of climate change were acknowledged by the San Diego team, but there does not appear to be a clear strategy for how to fill

these areas of additional long-term need. Other areas of long-term need, such as sustainable coastal fisheries are being more actively addressed.

In Santa Cruz, it would be helpful to develop a plan to guide economic and social research on protected salmonid species. The current needs and knowledge gaps are too numerous to be adequately filled by the Center (impacts of major proposed water infrastructure projects, value of in-stream flows, analysis of biological opinions and project operating rules, governance and legal structures of water management, economic analysis of dam removal, etc.), so prioritization and efforts to build and support research networks will be important.

2. Are the Center's economic and sociocultural programs appropriately integrated with each other and with other science activities within the Center? Are research efforts integrated, where relevant, with efforts at the regional offices and headquarters?

It was apparent that there was not a lot of integration between the La Jolla and Santa Cruz teams. Both groups appear to have important and growing integration with the Northwest region, and that is probably more appropriate than working with each other given the resources each group is focusing on. The review would have benefited with more information about integrated efforts with the Northwest region. The teams should explore opportunities for greater collaboration, especially in areas where technical experience and expertise (econometric techniques, survey design, etc.) is applicable to multiple resource areas. Ecosystem based management, communities research, and recreation are areas where efficiency and effectiveness might be enhanced through greater integration.

There is an opportunity to better connect the advances in salmonid science at the Santa Cruz center with the economic and social science efforts. I was told that an initial NSF grant proposal along these lines was not funded last year, so it appears these efforts are underway and both scientists and economists within the Center see the value and need. Further efforts to increase integration in this area should be supported. Regional management and scientists are continually hit with claims (often invalid or exaggerated) that they are ignoring socio-economic costs from efforts to protect and improve freshwater habitat. The Southwest center should support additional economic and cultural research in this area to support its decision-making processes and equip NMFS leadership to better articulate the value of conserving protected species resources.

It should also be noted that these teams are also significant contributors at the national (and international) level including but not limited to high-level academic partnerships, U.S. State department, the Ocean Recreation Survey and editing the annual Fisheries Economics of the United States.

3. Is the status of data collection related to commercial fisheries, recreational fisheries,

fishing participants, and communities adequate to fulfill economic and sociocultural science research needs? Has the Center/ST developed strategies to obtain, manage, and make data accessible? Are there barriers that impede data collection and access to data held by other entities (e.g. states, commissions, other federal agencies, etc.) that could be used to support the Center/ST's research, and how can these barriers be overcome?

There is evidence that the teams are adequately supporting data collection needs and are working to develop new tools to make data accessible to the public. Center economists are active participants in national data collection efforts.

Data management: There are some instances when Ph.D. level economists are spending a lot of time on data management and collection efforts. Greater staff support for data management could free researcher time for other high-value needs.

Surveys: Some examples of stated choice surveys were presented. It is important to ensure that that these surveys are designed to support economic research at the highest level, especially where surveys are supporting regulatory decisions that could be subject to future litigation. Additional review and design support of survey instruments should be considered before they are deployed.

4. Are the Centers/ST using appropriate models and research tools to analyze data and provide management advice? Are they developing and using methods and models that contribute to the evaluation and exploration of ecosystem based fisheries management and other emerging issues? Are there barriers to adapting to address emerging issues?

Economic research at the Center is high-caliber. Researchers have maintained state-of-the-art technical skills and deploy them in effective and creative ways in their research.

I am less confident that socio-cultural and communities research is at these same standards, and the lack of staff in this area across the Center is an obvious constraint to this.

5. Is the Center's/ST's social and economic information being used in living marine resource management advice? Are the existing mechanisms sufficient for ensuring this information is used appropriately? Are there barriers to the uptake of science provided by the Center and what steps can be taken to overcome these?

There is evidence that the Center's economic research and information is being effectively used to inform fisheries management decisions at the international, national and regional level.

I am concerned that the episodic nature of economic studies to support the salmonid protection efforts is inadequate to support a high-priority area. While there have been highly-effective studies initiated in this way such as the studies on agricultural employment response to water supplies, there are enormous economic research needs and gaps in this area where the southwest center could play a central role. A barrier in this area is that it does not have the routines and structure that commercial fisheries programs use to provide regular communication and feedback between managers, stakeholders and researchers. Thus, some internal planning and communication processes between managers and researchers may be helpful. I learned that a West Coast Habitat Economic Strategy project has recently started and is supported at the national level which appears to be an excellent opportunity to identify and address these barriers.

- 6. Is the Center providing the Best Available Science?** Are the Center/ST's economic and sociocultural research products adequately peer-reviewed? Are the appropriate processes being used to ensure that scientific products meet professional standards and are of high caliber?

The record of publishing peer-reviewed articles in high-caliber journals speaks for itself. Researchers maintain active academic collaborations with strong institutions (especially UC-San Diego) that keeps the Center current on advances in economic science.

- 7. Does the Center's/ST's program use the best tools to appropriately communicate research results to various managers, partners, stakeholders and the public?**

More could be done with social media and other communications platforms to communicate the value of the work with a broader group of stakeholders in a world where people (including managers and Ph.D. researchers) are getting information in new ways. Video is becoming more common, and the nature and settings of much of this research has inherent visual appeal that could lend itself to this. However, it is important to be careful that this does not increase demands on research staff. It was noted that communication staff were at the region level in the southwest, and these efforts could be better supported if the resources to support communication were closer to the research teams.

While this does not have to do with communication tools, the broad area of communication may be an area where the lack of social scientists at the regional level could inhibit the ability to communicate economic and human dimensions research results to partners, stakeholders and the public.

Panel Reviewer #5

Panelist report: SWFSC economics and human dimensions program review (July 25-27, 2017)

Overall comments

The review was professionally conducted and the SWFSC economists were articulate and passionate about their work. As such, it was a pleasure to participate as a reviewer.

The SWFSC economists cover a wide range of topics over a broad area (including U.S. fishery operations in the South Pacific). This is exciting work for resource economists and both the economists and their managers are to be congratulated.

The absence of a human dimensions researcher (anthropology and the other non-economics social science disciplines) at the SWFSC is unfortunate. It prevents the SWFSC from conducting analyses that could be extremely valuable to the resource management agencies. It is a lost opportunity that could be impoverishing regulatory decisions.

These reviews are an important component of a research agency's operations, and it is admirable that NOAA Fisheries is conducting them. The proof of the pudding, however, is how the SWFSC utilizes the feedback from the review panel in their future planning.

8. Program goals and objectives

While high-level mandates were identified for the program, e.g., the Magnuson-Stevens Act and Executive Order 12866, there was too little evidence of program-specific goals, objectives, or plans. Prioritization of some projects seemed idiosyncratic rather than strategic.

Each of the program staff showed considerable familiarity with those high-level mandates and related their research directly toward them, including participation, leadership, and tasking from various conservation and management bodies (e.g., PFMC's teams). Several staff also identified direct contact with fishing industry and other stakeholders as key to identifying research topics. This interaction is valuable and is to be acknowledged and appreciated, but at the same time it appears many of the economists are stretched thin, and the selection of research topics based on indirect input and intellectual curiosity does not represent the kind of organization expected of a government agency.

There was evidence that the existing small staff was not able to meet all of the "mandates" that might be expected from the Pacific Fisheries Management Council (PFMC) or the NOAA Fisheries West Coast Regional Office (WCRO) or other agencies, even though both agencies were complimentary of the economic research the SWFSC economists provided. Nonetheless, given the small size of the SWFSC economics (and human dimensions) staff, extensive involvement in fishery management teams (e.g., PFMC) **should** be commensurate to the depth of management needs and active regulation.

It is **recommended** that the SWFSC conduct a strategic planning exercise for its two economics and human dimensions programs focused on organization, coordination, and goals and objectives to prioritize program activities. This does not imply an integration of the two programs although that question could be part of such a strategic planning exercise. At the same time, opportunities should be seized to increase interaction between the two programs (and potentially the NWFSC), and potentially have one person to champion economic and human dimension priorities within SWFSC management.

Neither of the SWFSC economics and human dimensions programs has a human dimensions staff member. This appears to be a serious short-coming (recognized by the economists at the SWFSC). It is **recommended** that the SWFSC ameliorate this situation promptly.

The strategic planning exercise should also include clarification of the potential role of a human dimensions staff member, and to do so, there necessarily needs to be involvement of a human dimensions professional from outside the SWFSC (either from one of the other NOAA Fisheries science centers or from another agency, e.g., the Forest Service, or from an academic steeped in applied research).

9. Integration with other programs

SWFSC economists appear to be well connected to other programs within their respective laboratories, and with the external agencies with which they collaborate. Representatives of the PFMC and the WCRO had positive comments about the role of the SWFSC economics program in their management mandates.

The relationship of the SWFSC economics and human dimensions programs to the NOAA Fisheries Northwest Fisheries Science Center (NWFSC) would seem to merit strengthening, although SWFSC staff were supportive of the coordination with the NWFSC. Since the NWFSC has a human dimensions professional, deepening the link with the SWFSC should be able to identify additional areas for focus in California and on the high seas (including the use of academic or contracted human dimensions expertise, particularly until there is at least one human dimensions specialist in the SWFSC).

Although there is protected species social science conducted in the SWFSC (e.g., salmon), it might be useful to have someone who specialized in protected species economics (including Marine Mammal Protection Act (MMPA) issues).

Each program had positive comments about their relationship with the NOAA Fisheries Office of Science and Technology (ST) that provides substantial funding the SWFSC economics and human dimensions programs.

The nature and extent of the funding process with ST was unclear. Particularly since ST seems to be a substantial source of funding (and of national collaborative projects), it would have been useful to have a presentation by the ST program. The ST funding process **should** be integrated with SWFSC's economics and human dimensions strategic and operational plans.

Each program also appears to have excellent university connections. It would have been useful to have had a formal presentation of these relationships, including information and comments directly from ST and University researchers.

The use of graduate student networks seems to have been quite valuable. The economics and human dimensions programs should look to increase their exposure to post-doc and related fellowship opportunities, and the agency **should** support them in this effort.

10. Socio-economic data collection

Although there is a suite of data collection programs within the SWFSC economics and human dimensions program, it was difficult to divine to what extent these were extensions of standard fisheries data collection programs, continuous or regular socio-economic data collections, or episodic. It was also clear that the SWFSC economists lacked adequate data management support. In either case, it was not obvious this was a major short-coming for the research the economists chose to conduct but given limited staff resources, i.e., the six economists, this would seem to contribute to the perception that some of the staff was stretched thin.

This discussion suggested short-comings in organizational support. In some cases, the economics staff were spending considerable time on data management activities, including development of what are some quite interesting applications. While there is certainly a useful role for a researcher submerging themselves in data, in most cases these tasks should migrate rapidly to professional data managers who are attuned to the technology on the one hand but also to their user requirements (i.e., the economists and human dimensions specialists).

It is **recommended** that the data collection and data management situation be reviewed by SWFSC management, probably in conjunction with Northwest Fisheries Science Center socio-economics management. The role of data managers and program-specific programmers should be considered.

11. Models and research tools

Although the review was not focused on a detailed and extensive discussion of modeling approaches, it is clear that the SWFSC economists have cutting edge approaches and are highly engaged in their discipline. Many of their presentations displayed examples of considerable interest. Their publications record is stellar. Their management-directed analyses seemed to be on-target (as indicated by the WCRO deputy director's comments).

Recommendation: carry-on.

12. Resource management application

Management application for domestic fisheries and watershed issues seemed straight-forward. Involvement in various management committees was seen to be time-consuming but is also understood to be directly linked to program mandates and a direct source of information from stakeholders.

This may seem like an odd observation given the previous comment on “Models and research tools”, but the conservation and management nexus on highly migratory species was unclear. It would seem there could be two tracks for this work: providing strategic and tactical economic advice to the U.S. State Department and NOAA Fisheries managers on competitive advantage (and consequences) for the U.S. fishing industry; and working with RFMO and other international agencies on developing robust measures of economic performance and regulatory analysis that could assist RFMOs build management strategy evaluation (MSE) approaches.

13. Best available science

The publication record of the SWFSC economists is stellar, and as such, it suggests that overall, they are providing the “best available” science. However, for non-journal work (e.g., work prepared for PFMC deliberations), a stronger internal review process would appear to be warranted. This would include not only informal publications (e.g., those headed to management bodies) but also the design and execution of projects (e.g., surveys).

14. Communication of results

The primary conduit of communication for the SWFSC economists appears to be professional journals, informal reports to management bodies, and presentations before management bodies. In addition, the economists appear to have good relationships with stakeholders that allows them to communicate one-on-one, and that is to be highly valued.

However, the economists expressed reluctance to use social media for communication of their work. Social media (Facebook and Twitter) can be an excellent source of making professional research results widely available to the public (as well as stakeholders and other professionals), particularly if it links on-line to in-depth articles or the published work of the economists.

We are not talking about using social media alone, e.g., relying on Twitter’s 140-character limit. We are also not talking about informal communication: the use of social media should be professional, only.

The SWFSC has a reasonable website in terms of attractiveness and information content, although it is not particularly easy to navigate (a problem with many of the NOAA websites examined in the context of this review). They rely on the NOAA Fisheries West Coast Regional Office for social media (e.g., the WCRO’s Facebook and Twitter presence, as well as that of the PFMC), and the WCRO approach appears to be limited.

It is **recommended** that the SWFSC, in conjunction with the WCRO, reconsider their approach to social media in introducing research activities and results.